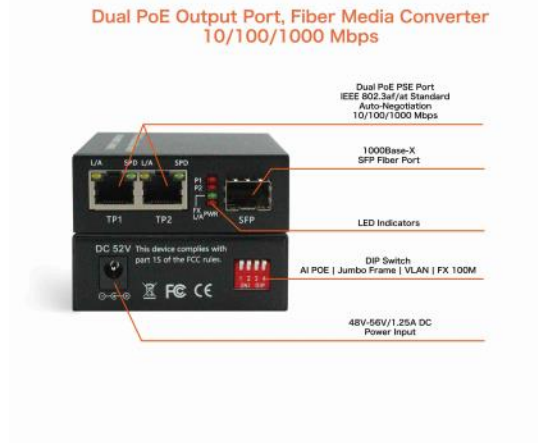# ROBOfiber

FC-1002-PSE
PoE+ PSE
Ethernet Media Converter

User Manual

www.robofiber.com

PoE PSE Fiber Media Converter

This user manual describes how to install and use the PoE+ PSE Ethernet Media Converter.

❖ DIP Switch Functions

DIP Switch	Name	Status	Description
#1	Reserved	OFF	\
		ON	\
#2	Jumbo Frame	OFF	Jumbo Frame Disable
		ON	Jumbo Frame Enable
#3	VLAN	OFF	VLAN Disable
		ON	VLAN Enable
#4	FX100M	OFF	FX 1000M
		ON	FX 100M

Notes: 1. FX Reset: When enabled, media converter will reboot when fiber link is down.
2. ALS, Automatic laser shutdown is a procedure to automatically shut down the laser when there is no input light
4. AI PoE: When enabled, the PoE will restart if there is no data input to the UTP receiver.
5. FX: Optical Fiber Port Speed Settings

❖ Power Supply Specifications

Item	Specification
Power Input	1
Operating Voltage	48-56V
Power Consumption	3W Max(Without PoE Load)
Protection	Overload Current
AC Plug Types	Australia (SAA/3), China (PSB-10), Europe (CEE 7/7), Italy (CEI 23-16/VII), Japan (L6-20P), North America (L6-20P), North America NEMA (L6-20), UK (BS89/13)

❖ **Optical Fiber Port**

SFP Transceiver Module

Different SFP modules can be selected as required (Please refer to our SFP selection list for the appropriate module). To insert/remove the SFP, follow below steps:

1. On the side panel, insert the SFP module into the SFP port until it is securely locked.
2. Connect the optical fiber (1/2 core) to the LC connector(s) of the SFP.
3. To remove the SFP module, press down the lock of the LC connector of the optical fiber to pull out the fiber cable.
4. Pull down the SFP lever and hold its position. Pull out the SFP module from the SFP port.
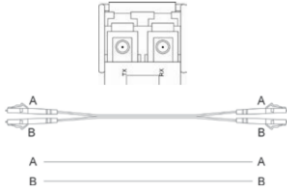
Notes: If you make your own cable, we suggest labeling the two sides of the same line with the same letter (A-to-A and B-to-B, shown as below, or A1-to-A2 and B1-to-B2).
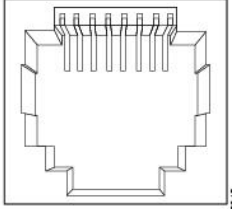
❖ **LED Indicators**

LED	State	Indication
PWR	On	Power On
PWR	Off	Power Off
SPD	On	On: RJ45 is connected at the highest possible speed
SPD	Off	Off: RJ45 is not connected or is connected at a speed slower than the highest possible
FX L/A	Solid	SFP is connected but no data is being receiver
FX L/A	Flashing	SFP is connected and data is being received
PoE(1 and 2)	On	PoE power is being supplied
PoE(1 and 2)	Off	No PoE power is being supplied

❖ **RJ45 Ethernet Port**

RJ 45 ports support automatic MDI/MDI-X operation. Ports connect to a PC, Server, Converter and HUB. Pins 1,2,3,6 Corresponding connections in MDI. 1→3, 2→6, 3→1, 6→2 are used as cross wiring in the MDI-X port of Converter and HUB. 10/100/1000Base-TX are used in MDI/MDI-X, as per below table definitions.

1000Mbps 1000Base-T, RJ45 Connector Pin Assignment			10/100Mbps 10/100Base-T, RJ45 Connector Pin Assignment		
Pin	MDI Signal Definition	MDIX Signal Definition	Pin	MDI Signal Definition	MDIX Signal Definition
1	BI_DA+	BI_DB+	1	TD+	RD+
+	BI_DA-	BI_DB-	2	TD-	RD-
3	BI_DB+	BI_DA+	3	RD+	TD+
4	BI_DC+	BI_DD+	4	NC	NC
5	BI_DC-	BI_DD-	5	NC	NC
6	BI_DB-	BI_DA-	6	RD-	TD-
7	BI_DD+	BI_DC+	7	NC	NC
8	BI_DD-	BI_DC-	8	NC	NC

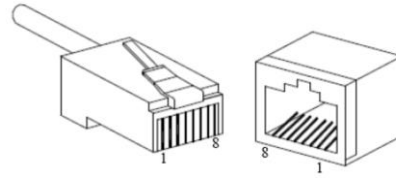| Pin	Label	1 2 3 4 5 6 7 8
1	TP0+	
2	TP0-	
3	TP1+	
4	TP2+	
5	TP2-	
6	TP1-	
7	TP3+	
8	TP3-	

Figure 1 10/100/1000M Lan Port Pinouts

As mentioned, an Ethernet crossover cable is used to connect two ports of the same configuration (i.e. MDI-to-MDI or MDIX-to-MDIX). However, this may generate confusion when deploying two different types of Ethernet cables. Thus the auto-MDI/MDIX technology is used to fix this problem: It automatically switches between MDI and MDIX as needed. Auto MDI/MDIX ports on newer device interfaces detect if the connection requires a crossover, then automatically choose the MDI or MDIX configuration to properly match the other end of the link. In this case, it doesn't matter if you're using straight through or crossover cables. The chart below shows cable types for MDI/MDIX and auto-MDIX.

Setting	MDI/MDIX Device Type	
	PC or other MDI Device	Switch, hub or other MDIX Device
MDI	Crossover cable	Straight-through cable
MDIX	Straight-through cable	Crossover cable
Auto-MDI/MDIX	Either crossover or straight-through cable	

❖ **Power over Ethernet(PoE) Pinout Diagram**

Power over Ethernet or PoE is a standard system that transmits or delivers electrical power along with data through the same cable. We know that there are different types of network cables available such as Cat6, Cat7, Cat5e, etc, and different types of ports also available such as RJ45. RJ45 has a total of eight pins and it connects with an Ethernet cable that consists of eight separate wires. Not all these eight wires are used for data transmission, so some of them can be used for electrical power transmission. As per the IEEE standard, the electrical current should interface with the data transmission and the cable should be safe.

The Power over Ethernet system works under the standardization of the (Institute of Electrical and Electronics Engineers)IEEE 802.3 committee. Generally, PoE delivers 47-57V DC power. This PoE system is used for both data and power transmission purposes in Internet Protocol(IP) cameras, Wireless Access Points(WAPs), Voice over Internet Protocol(VoIP), etc.

According to the IEEE standard cat5 or better cable is required for the transmission of high power levels. But cat3 cable also can be used if less power transmission is required. The PoE system was physically implemented under the specification of IEEE 802.3af-2003. Also, we know that there are two categories for the RJ45 color code - T568A and T568B.

❖ IEEE 802.3af -2003 Standard PoE Pinout Diagram for T568A

No.	Description
1	White Green(TX+)
2	Green(TX-)
3	White Orange(RX+)
4	Blue(DC+) - PoE
5	White Blue(DC+) - PoE
6	Orange(RX-)
7	White Brown(DC-) - PoE
8	Brown(DC-) - PoE

No.	Description
1	White Orange(TX+)
2	Orange(TX-)
3	White Green(RX+)
4	Blue(DC+) - PoE
5	White Blue(DC+) - PoE
6	Green(RX-)
7	White Brown(DC-) - PoE
8	Brown(DC-) - PoE

*Hold the golden strips upwards

❖ Installation

Before installation, confirm that the work environment meets installation requirements, including power needs and space.

1. Avoid direct sunlight, keep away from the heat sources or excessive EMI.
2. Examine cables and plugs are matching requirements.
3. Check copper cables to not exceed 100m(~305ft) in length.
4. Power: AC 90-240V power input
5. Environment requirements:
   Working Temperature: 0 ~ 50℃ (32 to 122℉)
   Storage Temperature: -20 ~ 70℃ (-4 to +158℉)
   Relative Humidity 5% ~ 95% (noncondensing)

❖ Assembly, Startup, and Removal

• Installation: Mount the unit onto a fixture, or camera housings, e.g. a plank, (either on the wall or on a flat surface) with at least 2 screws piercing through the holes on the mounting frame to secure it in position.
• Startup: Connect the supply voltage to start up the Media Converter via the terminal block.
• Removal: Locate and remove the securing screws. Usually, but not limited to, at least 2 screws.

❖ Wiring Requirements

1. It is required to check that type, quantity and specifications of cable used match the requirements before laying out the cable;
2. Check for cable damage and quality assurance booklet before installation;
3. Cable specifications, quantity, direction and laying position need to match application requirements;
4. Cables must be in good condition, no cuts/tearing of jacket;
5. Cables should generally run straight between turning points;
6. Cable should lay straight in wiring ducts or plenum space. Cables should be banded and tightened to enough support points when not in ducts;
7. User cables should be separated from power lines. Cables, power lines and grounding lines cannot be overlapped and mixed when they are in the same path. Avoid aerial cable lengths, cables cannot hold themselves;
8. Fiber Pigtails cannot be tied and should be bended as less as possible. Bending radius cannot be too small (small radius causes high fiber loss link).
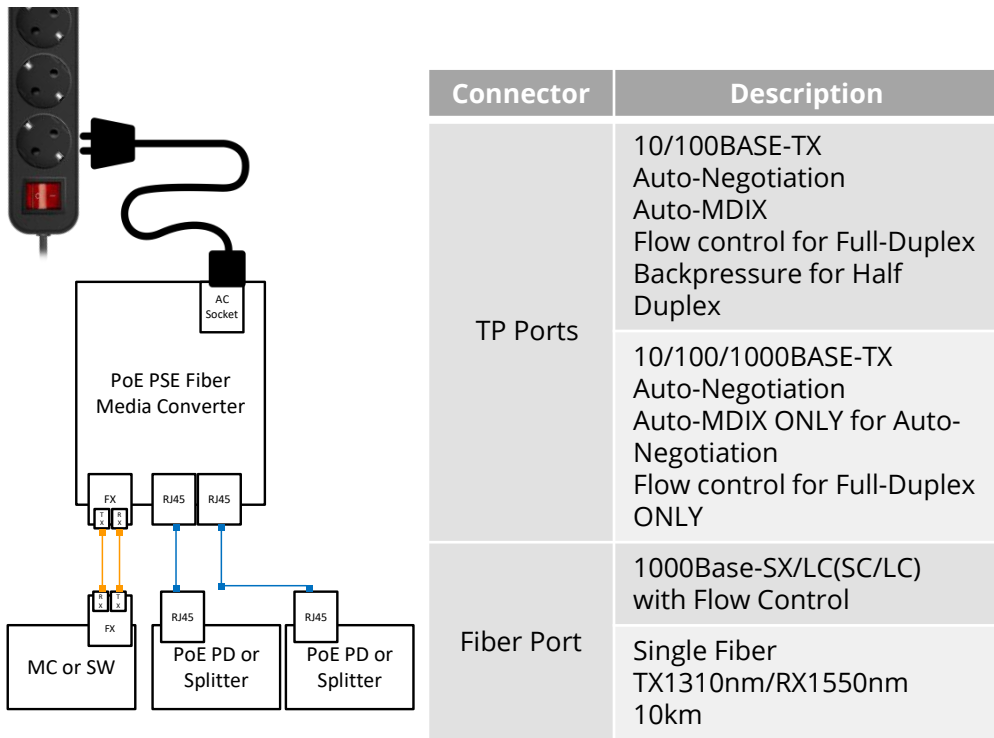
Connector	Description
TP Ports	10/100BASE-TX Auto-Negotiation Auto-MDIX Flow control for Full-Duplex Backpressure for Half Duplex
	10/100/1000BASE-TX Auto-Negotiation Auto-MDIX ONLY for Auto-Negotiation Flow control for Full-Duplex ONLY
Fiber Port	1000Base-SX/LC(SC/LC) with Flow Control
	Single Fiber TX1310nm/RX1550nm 10km

Figure: Connecting the Converter

❖ Cable Connection Parameter

- 1000BASE-SX/LX networks only support full-duplex mode. The Switch based Media Converter breaks up TP and Fiber segments' collision domain to extend the cabling distance.
- UTP Cables: CAT5, or above CAT5e class UTP cables
- UTP Cable Limitations: Max. Length up to 328 feet (100 m)
- Fiber Cables:
- 1000BASE-SX: 50/125, 62.5/125, or 100/140μm multimode
- 1000BASE-LX: 8.3/125, 8.7/125, 9/125 or 10/125μm single-mode

Connector	Multimode Fiber		Sigle-mode Fiber	
1000Base-SX(850nm)	Bandwidth MHZ-KM	Distance	Bandwidth MHZ-KM	Distance
	260	220m	400	500m
	200	275m	500	550m
1000Base-LX (1310nm/1550nm)	Single-mode Fiber 9/125um:2km Single-mode Transceiver 1310nm: 10/20km Single-mode Transceiver 1550nm: 40-120km			

❖ Specifications

Ethernet Standards	
Standards	IEEE802.3i 10Base-T IEEE802.3u 100Base-TX & 100Base-FX IEEE802.3ab 1000Base-T IEEE802.3z 1000Base-X IEEE802.3x Flow Control IEEE802.3af 15W PoE IEEE802.3at 30W PoE+
Switching Capacity	6Gbps
Jumbo Frames	9K
Power	
Power Input	1
Operating Voltage	48-56VDC
PoE Power Capacity	IEEE802.3 af : 15.4W x2 IEEE802.3 at : 30W x2
Power Consumption	af mode: <35W at mode: <65W
Protection	Over Current
Mechanical	
Housing	Metal
Dimensions	94mm×71mm×26mm(W x D x H) 3.70 x 2.80 x 1.02in
IP Rating	IP30
Weight	0.2kg/0.44lb(converter only)
Installation	Desktop or Wall Mount
Environmental	
Temperature	Operating: 0 to 50℃ （32 to 122℉） Storage: -20 to +70℃ （-4 to +158℉）
Humidity	5 to 95% noncondensing
Altitude	＜3000m(＜10000 ft.)
MTBF	100,819 Hours
MTBF Standard	Telcordia SR-332 GB 25℃
Heat Dissipation	113 BTU/h （With 30W PoE）
Cooling	Passive Cooling
Noise Level	0 dBA

❖ Regulatory Information

1.1 Electronic Emission Notices
This equipment has been tested and found to comply with the FCC Part 15, Subpart B, Class A and protection requirements of European Emission Standard as follows: EMI Comply with FCC Part 15 Class A & CE Mark Approval LVD EN 62368-1 Safety UL and others by request

1.2 FCC Class a statement
This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

1.3 Disclaimer
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